

Mississippi State University
Invitation for Bid 21-23, Atomic Force Microscope
Addendum One

March 24, 2021

The following question was received pertaining to the above bid file. See answers below and bid accordingly. Acknowledge this addendum by writing the number and date of the addendum on the bid form.

- 1) The bid specifications appear to be specifically for one vendor.
 - A) Please replace the original Bid specifications with the new specifications and pricing sheet.

Bid date has been extended until **Wednesday April 14, 2021 @2:00 p.m.**

Bid Number/RFX Number: 21-23/RFX#3160004221

Submission Deadline: April 7, 2021 @2:00 p.m.

Description: Atomic Force Microscope

Vendor Name: _____

Vendor Address: _____

Telephone Number: _____

Days the Offer is Firm: _____

Authorized Signature: _____

Name: _____

Title: _____

Item	Quantity	Description	Unit Price	Total Price
1	1	Atomic Force Microscope		

- The AFM must have a system (height) noise better than 30 pm RMS, in typical imaging bandwidth, and therefore atomic resolution images with defects can be routinely achieved on applicable samples, such as calcite and mica.
- The AFM must have an open design of head, which allows to easily add external optical device on the side of head at an oblique angle to for instance: apply an external laser source to the tip-sample junction. In addition, the system must include a monocular microscope and illuminator for positioning the STM tip on samples.
- The AFM engage mechanism must be automated, vertical, and fully software controlled to prevent possible user damage to tips or samples from manual engage processes.
- The AFM must have multiple scanners optimized for different applications: large area scanners for larger sample features and small area scanners for routine atomic resolution in AFM and STM imaging.
- The AFM must have all major SPM imaging modes, including contact mode, tapping mode, and a high-resolution imaging mode based on sinusoidal force ramps.

- As a high-resolution imaging mode, the sinusoidal force ramp-based mode must have the following features:

- No cantilever tuning is required so the imaging protocol in air and liquid is much easier than the tapping mode.

- Use a lock-in based feedback mechanism to control the tip-sample interaction force to better preserve tips and samples.

- Have ramp frequencies in the order of kHz to ensure an effectively high image acquisition time at standard AFM pixel densities i.e. ~8min for a 512 X 512 pixel image.

- Have an automated image optimization routine that adjusts the feedback gain constantly while scanning to ensure consistent sample topography tracking to obtain high fidelity images in air and liquid.

- The AFM must include a conductive AFM (cAFM) option with software selectable gain stages.

- The AFM must include a fluid imaging accessory to allow samples to be scanned in fluid environments.

- The system must include two STM heads, one conventional STM head and one electrochemistry STM head with a 10^8 V/A transimpedance amplifier and the STM current RMS noise must be less than 2pA to be able to capture STM single molecular break junction events as is the main scope of the research requirement.

- The capability of conducting STM single molecular break junction measurements must be validated by peer reviewed published data in scientific journals.

- The system must include all accessories to support electrochemical STM measurements.

- The system must allow access to raw signals to and from the AFM controller, including the STM current. In addition, the system should be able to receive external modulation signals (+/-10V range) to the Z-piezo during STM measurements (including ramp and surface delay) to augment proposed single molecular break junction measurements.

- The AFM must be a brand-new AFM system with a Windows 10, 64-bit operating system computer for real time measurements and analysis software that is not limited by license such that it can be placed on an unlimited number of user computers.